

5 CLAIMS

What is claimed is:

1. A method for modifying the structure of a network accessible web site based on an analysis of activity associated
 10 with the web site, the method comprising the steps of:
 monitoring activity associated with said web site;
 maintaining data representative of said activity and a
 present structure of said web site;
 applying a set of rules to said data to generate a
 15 recommendation; and
 modifying said structure of said web site based on said
 recommendation.

2. The method of claim 1, wherein the web site comprises a
 20 home page, and a plurality of objects of interest, the home page
 and plurality of objects of interest being accessible by a
 network address, and further comprising the step of identifying
 said present structure of said web site.

3. The method of claim 2, wherein the step of identifying
 25 said present structure of said web site further comprises the
 steps of:
 accessing said web site via said network address;
 parsing the structure data of said web site to generate said
 30 present structure; and
 storing data representative of said present structure.

5 4. The method of claim 3, wherein the objects of interest of the web site have an inter-connection relationship to each other, numeric identifiers, names, and aliases to the names, and the step of parsing the structure data further comprises at least one of the following steps:

- 10 (a) retrieving said names of said objects of interest;
- (b) retrieving said numeric identifiers of said objects of interest;
- (c) retrieving said aliases corresponding to said objects of interest;
- 15 (d) retrieving said inter-connection relationship of said objects of interest;
- (e) retrieving a list of children, wherein said children are the identities of all said objects of interest that may be accessed directly from a particular object of interest;
- 20 (f) retrieving a list of parents, wherein said parents are the identities of all said objects of interest that have direct access to a particular object of interest; and
- 25 (g) retrieving a list of page distances, wherein said page distances are the number of objects of interest that must be accessed to get from one object of interest to a different object of interest.

30 5. A computer-readable medium having computer executable instructions for performing the steps recited in claim 1.

 6. A computer-readable medium having computer executable instructions for performing the steps recited in claim 2.

35 7. A computer-readable medium having computer executable instructions for performing the steps recited in claim 3.

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8. The method of claim 2, wherein activity associated with the web site is comprised of user sessions, the user sessions comprising user accesses, the step of monitoring activity further comprises the steps of:

- 10 identifying a user of said user sessions;
mapping data associated with said user session; and
storing said data associated with said user session in a
data storage means.

- 15 9. The method of claim 8, wherein the step of mapping the data further comprises the following steps:
retrieving the order of user accesses to said web site's
objects of interest; and
retrieving the time of said user accesses to said web site's
20 objects of interest.

10. A computer-readable medium having computer executable instructions for performing the steps recited in claim 8.

- 25 11. A computer-readable medium having computer executable instructions for performing the steps recited in claim 9.

5 12. The method of claim 2, wherein said maintaining step
further comprises at least one of the following steps:

- (a) creating an elements data structure, wherein said
elements data structure indicates a total number of
objects of interest within said web site;
- 10 (b) creating a session step data structure, wherein said
session step data structure indicates the maximum
number of steps in any of said user sessions;
- (c) creating a SPUS structure, wherein said SPUS structure
indicates a total number of steps per user session;
- 15 (d) creating a TUS structure, wherein said TUS structure
indicates a total number of user sessions;
- (e) creating a CLASS structure, wherein said CLASS
structure indicates a class for each object of interest
in said web site; and
- 20 (f) creating a TC structure, wherein said TC structure
indicates a total number of said classes in said web
site.

5 13. The method of claim 12, wherein said maintaining step further comprises at least one of the following steps:

(a) creating a distance matrix, said distance matrix having two dimensions, wherein said distance matrix indicates the shortest object distance;

10 (b) creating a links-to matrix, said links-to matrix having two dimensions in the form [x][y], wherein said links-to matrix indicates the number of links to a particular object of interest by a specific Step or less, the number of links is indicated by [y], the specific Step or less is indicated by [x];

15 (c) creating a links-from matrix, said links-from matrix having two dimensions in the form [x][y], wherein said links-from matrix indicates the total number of links from a certain object of interest to other objects of interest by a specific Step or less, the total number of links to other objects of interest being indicated by [x], and the specific Step or less being indicated by [y];

20 (d) creating a total accesses-to matrix, wherein said total accesses-to matrix indicates the total number of accesses to a particular object of interest in a specific Step within said user session;

25 (e) creating a total access-from matrix, wherein said total access-from matrix indicates the total number of
30 accesses from a particular object in a specific step within said user session; and

(f) creating an access matrix, said access matrix having three dimensions in the form [x][y][z], wherein said access matrix indicates the number of times an object of interest was accessed from one particular object of interest to a different object of interest at a specific Step, from one particular object of interest being indicated by [x], to a different object of interest being indicated by [y], and the specific Step being indicated by [z].

14. A computer-readable medium having computer executable instructions for performing the steps recited in claim 12.

15. A computer-readable medium having computer executable instructions for performing the steps recited in claim 13.

16. The method of claim 2, wherein the basic rules are applied utilizing a rule engine algorithm and an anomalies floatation device, the step of applying a set of rules further comprising the steps of:

- (a) applying a rule of object distance, wherein said object distance is the number of objects of interest that must be accessed to get from one of said objects of interest to a different object of interest;
- (b) applying a rule of Step, wherein the Step is the number of objects of interest that is actually accessed to get from one of said objects of interest to a different said objects of interest during said user session; and
- (c) applying a rule of Class, wherein said Class is the number of objects of interest that must be accessed to get from said homepage of said web site to said objects of interest.

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transferring the maintained data to said anomaly floatation
device;
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comparing an expected activity data to said data

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5 18. The method of claim 17, wherein the step of comparing
further comprises at least one of the following steps:

- (a) applying a step-distance anomaly, wherein said step-
distance anomaly is based on at least the number of
accesses in the particular Step and the distance
10 between two particular objects of interest;
- (b) applying a no-link anomaly, wherein said no-link
anomaly is based at least in part on the number of
accesses in a particular Step and the distance between
15 the two particular objects of interest, the two
particular objects of interest having no direct
hyperlink;
- (c) applying a dominant anomaly, wherein said dominant
anomaly is based at least in part on a dominant object
of interest from which the most accesses are made to a
20 particular object of interest in a particular Step;
- (d) applying a deficiency anomaly, wherein said deficiency
anomaly is based at least in part on a deficient object
of interest to which a deficient number of accesses are
made from a particular object of interest in a
25 particular Step;
- (e) applying a dominant-connect anomaly, wherein said
dominant-connect anomaly is based at least in part on a
dominant number of accesses being made from said
dominant object of interest among a plurality of
30 connected objects of interest to a particular object of
interest in a particular Step;

- 5 (f) applying a deficiency-connect anomaly, wherein said deficiency-connect anomaly is based at least in part on a deficient number of accesses being made from a deficient object of interest among a plurality of connected objects of interest to a particular object of interest in a particular Step;
- 10 (g) applying a high access ratio anomaly, wherein said high access ratio anomaly is based at least in part on the number of accesses in a particular step using only one direction of access and the distance between the two particular objects of interest, the two particular
- 15 objects of interest having no direct hyperlink;

19. The method of claim 18, wherein if the step of applying a dominant anomaly is applied, the step of comparing further

20 comprises at least one of the following steps:

- (h) applying a threshold-dominant anomaly, wherein said threshold-dominant anomaly is based at least in part on the most accesses to a given object of interest at a plurality of step distances, the accesses to said given object of interest must exceed a pre-set minimum; and
- 25 (i) applying a complete-a-link anomaly, wherein said complete-a-link anomaly is based at least in part on the ratio of accesses from a particular objects of interest directly linked to another versus a particular objects of interest linked to others by a greater
- 30 distance.

20. A computer-readable medium having computer executable instructions for performing the steps recited in claim 16.

35 21. A computer-readable medium having computer executable instructions for performing the steps recited in claim 17.

22. A computer-readable medium having computer executable instructions for performing the steps recited in claim 18.

23. A computer-readable medium having computer executable instructions for performing the steps recited in claim 19.

24. The method of claim 2, wherein the step of customizing the web site is performed automatically by a computer-readable medium having computer executable instructions for performing the step, based at least in part on said recommendations for customizing said web site.

25. The method of claim 2, wherein the step of customizing said web site is performed by interacting with said web site structure through human intervention, based at least on said recommendations for customizing said web site.

26. The method of claim 1, wherein activity associated with the web site is comprised of user sessions, the user sessions comprising user accesses, the step of monitoring activity further comprises the steps of:

- identifying a user of said user sessions;
- mapping data associated with said user session; and
- storing said data associated with said user session in a data storage means.

5 27. The method of claim 26, wherein the step of mapping the
data further comprises the steps of:
 retrieving the order of user accesses to said web site's
 objects of interest; and
 retrieving the time of said user accesses to said web site's
10 objects of interest.

 28. A computer-readable medium having computer executable
instructions for performing the steps recited in claim 26.

 29. A computer-readable medium having computer executable
15 instructions for performing the steps recited in claim 27.

 30. The method of claim 1, wherein said maintaining step
further comprises at least one of the following steps:

- (a) creating an elements data structure, wherein said
20 elements data structure indicates a total number of
 objects of interest within the website;
- (b) creating a session step data structure, wherein said
 session step data structure indicates the maximum
 number of steps in any of said user sessions;
- (c) creating a SPUS structure, wherein said SPUS structure
25 indicates a total number of steps per user session;
- (d) creating a TUS structure, wherein said TUS structure
 indicates a total number of user sessions;
- (e) creating a CLASS structure, wherein said CLASS
30 structure indicates a class for each object of interest
 in said web site; and
- (f) creating a TC structure, wherein said TC structure
 indicates a total number of said classes in said web
 site.

5 31. The method of claim 30, wherein said maintaining step further comprises at least one of the following steps:

- (a) creating a distance matrix, said distance matrix having two dimensions, wherein said distance matrix indicates the shortest object distance;
- 10 (b) creating a links-to matrix, said links-to matrix having two dimensions in the form [x][y], wherein said links-to matrix indicates the number of links to a particular object of interest by a specific Step or less, the number of links is indicated by [y], the specific Step or less is indicated by [x];
- 15 (c) creating a links-from matrix, said links-from matrix having two dimensions in the form [x][y], wherein said links-from matrix indicates the total number of links from a certain object of interest to other objects of interest by a specific Step or less, the total number of links to other objects of interest being indicated by [x], and the specific Step or less being indicated by [y];
- 20 (d) creating a total accesses-to matrix, wherein said total accesses-to matrix indicates the total number of accesses to a particular object of interest in a specific Step within said user session;
- 25 (e) creating a total access-from matrix, wherein said total access-from matrix indicates the total number of accesses from a particular object in a specific step within said user session; and
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(f) creating an access matrix, said access matrix having three dimensions in the form [x][y][z], wherein said access matrix indicates the number of times an object of interest was accessed from one particular object of interest to a different object of interest at a specific Step, from one particular object of interest being indicated by [x], to a different object of interest being indicated by [y], and the specific Step being indicated by [z].

32. A computer-readable medium having computer executable instructions for performing the steps recited in claim 30.

33. A computer-readable medium having computer executable instructions for performing the steps recited in claim 31.

34. The method of claim 1, wherein the basic rules are applied utilizing a rule engine algorithm and an anomalies floatation device, the step of applying a set of rules further comprises the steps of:

- (a) applying a rule of object distance, wherein said object distance is the number of objects of interest that must be accessed to get from one of said objects of interest to a different object of interest;
- (b) applying a rule of Step, wherein the Step is the number of objects of interest that is actually accessed to get from one of said objects of interest to a different said objects of interest during said user session; and
- (c) applying a rule of Class, wherein said Class is the number of objects of interest that must be accessed to get from said homepage of said web site to said objects of interest.

5 35. The method of claim 34, wherein said step of applying a
set of rules further comprises the steps of:

transferring the maintained data to said anomaly floatation
device;

comparing an expected activity data to said data

10 representative of said activity, wherein said anomalies
floatation device having an output comprised of
anomalies; and

grouping said anomalies according to said activity, wherein
said grouping is performed by said rule engine

15 algorithm to indicate recommendations.

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5 36. The method of claim 35, wherein the step of comparing
further comprises at least one of the following steps:

- 10 (a) applying a step-distance anomaly, wherein said step-
distance anomaly is based on at least the number of
accesses in the particular Step and the distance
between two particular objects of interest;
- 15 (b) applying a no-link anomaly, wherein said no-link
anomaly is based at least in part on the number of
accesses in a particular Step and the distance between
the two particular objects of interest, the two
particular objects of interest having no direct
hyperlink;
- 20 (c) applying a dominant anomaly, wherein said dominant
anomaly is based at least in part on a dominant object
of interest from which the most accesses are made to a
particular object of interest in a particular Step;
- 25 (d) applying a deficiency anomaly, wherein said deficiency
anomaly is based at least in part on a deficient object
of interest to which a deficient number of accesses are
made from a particular object of interest in a
particular Step;
- 30 (e) applying a dominant-connect anomaly, wherein said
dominant-connect anomaly is based at least in part on a
dominant number of accesses being made from said
dominant object of interest among a plurality of
connected objects of interest to a particular object of
interest in a particular Step;

- 5 (f) applying a deficiency-connect anomaly, wherein said
deficiency-connect anomaly is based at least in part on
a deficient number of accesses being made from a
deficient object of interest among a plurality of
connected objects of interest to a particular object of
10 interest in a particular Step;
- (g) creating a high access ratio anomaly, wherein said high
access ratio anomaly is based at least in part on the
number of accesses in a particular step using only one
direction of access and the distance between the two
15 particular objects of interest, the two particular
objects of interest having no direct hyperlink;

37. The method of claim 36, wherein if the step of applying
a dominant anomaly is applied, the step of comparing further
20 comprises at least one of the following steps:

- (h) applying a threshold-dominant anomaly, wherein said
threshold-dominant anomaly is based at least in part on
the most accesses to a given object of interest at a
plurality of step distances, the accesses to said given
25 object of interest must exceed a pre-set minimum; and
- (i) applying a complete-a-link anomaly, wherein said
complete-a-link anomaly is based at least in part on
the ratio of accesses from a particular objects of
interest directly linked to another versus a particular
30 objects of interest linked to others by a greater
distance.

38. A computer-readable medium having computer executable
instructions for performing the steps recited in claim 34.

39. A computer-readable medium having computer executable
instructions for performing the steps recited in claim 35.

5 40. A computer-readable medium having computer executable instructions for performing the steps recited in claim 36.

 41. A computer-readable medium having computer executable instructions for performing the steps recited in claim 37.

10 42. The method of claim 1, wherein the step of customizing the web site is performed automatically by a computer-readable medium having computer executable instructions for performing the step, based at least in part on said recommendations for
15 customizing said web site.

 43. The method of claim 1, wherein the step of customizing said web site is performed by interacting with said web site structure through human intervention, based at least on said
20 recommendations for customizing said web site.

 44. An apparatus for modifying the structure of a network accessible web site, the apparatus comprising:
25 a communications means for establishing communications with said web site;
 an input for accepting data representative of activity associated with said web site;
 a memory buffer for providing storage for a structure associated with said web site and said activity;
30 a processing unit for:
 applying a set of rules to said activity and said structure;
 generating a recommendation; and
 an output for providing said recommendation.

5 45. An apparatus for modifying the structure of a network
accessible web site, the apparatus comprising:
a communications means for establishing communications with
said web site;
an input for accepting data representative of activity
10 associated with said web site and a structure
associated with said web site;
a memory buffer for providing storage for said structure and
said activity;
a processing unit for
15 applying a set of rules to said activity and said
structure;
generating a recommendation; and
an output for providing said recommendation.